45

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/699,188	10/27/2000	James H. Parry	21706-05327	6572

7590 10/22/2003

MR. ROBEERT W. HOLLAND
HAMILTON & TERRILE, LLP
8911 NORTH CAPITAL OF TEXAS HIGHWAY
SUITE 4150
AUSTIN, TX 78759

EXAMINER	
JAMAL, ALEXANDER	
ART UNIT	**PAPER NUMBER**
2643	6

DATE MAILED: 10/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/699,188	PARRY, JAMES H.
	Examiner	Art Unit
	Alexander Jamal	2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 27 October 2000 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-51 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1-51** rejected under 35 U.S.C. 102(b) as being anticipated by Chu (5263019).

a. **Claim 1:** Chu discloses a module for an audio communications system comprising:

i. A first input for receiving a first audio signal shown as S(z) and being input to whitening filter 28, microphone gain sensor 60 and output signal conditioner 33 (Fig. 1).

ii. A second input for receiving a second audio signal from microphone 10 (Fig. 1). Wherein a portion of the second audio signal includes an echo from the first audio signal (transmitted through speaker 32) (Col 1 lines 15-27).

iii. Distortion module 15 (Fig. 1) receives the first audio signal and models a distortion on the first audio signal to create an estimation of the first signal echo sensed on the second audio signal (Col 3 lines 23-28).

iv. An adder module 54 (Fig. 3) is used to subtract the echo estimation of the first audio signal from the second audio signal in order to remove at least part of the echo from the second audio signal (Col 7 line 64 to Col 8 line 15).

b. **Claim 2:** Chu's system is implemented digitally (Col 3 lines 44-47). As such the first and second audio signals would inherently bear sequencing information that would be used by all parts of the system (including the adder module) for the purpose of synchronizing the input audio signals with the echo estimation signal.

c. **Claim 3:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module (audio generation module) to model the channel response between the loudspeaker and microphone which includes the distortion generated by playing the first audio signal through a speaker (Col 7 line 64 to Col 8 line 8).

d. **Claim 4:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This includes a modeling path comprising distortion modules to model distortions on the first audio signal via the chosen filter tap wieghts (Col 7 line 64 to Col 8 line 8).

e. **Claim 5:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses multiple distortion modules at various frequency bands to model the various channel responses (ie. the different types of distortions at each frequency band) between the loudspeaker and microphone (Col 7 line 64 to Col 8 line 8).

f. **Claim 6:** Chu's system operates in a standard communication system (Col 1 lines 15-25), as such the distortion module (comprised of the audio generation module) must

inherently alter the modeling path with real-time responsiveness for the purpose of allowing standard, real-time communication to occur between users of Chu's system.

g. **Claims 7-10:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This channel response would include a modeling path comprising distortion modules to model distortions of the first audio signal (such as: amplifier clipping, voice coil displacenment on sound pressure waves, iron-core inductor hysteresis, and harmonic distortion) via the chosen filter tap wieghts (Col 7 line 64 to Col 8 line 8).

h. **Claim 11:** Chu's system comprises distortion 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This includes an acoustic echo estimation module to distort the first audio signal in order to model for the linear changes in the second audio signal (Col 2 lines 9-34) (Col 7 line 64 to Col 8 line 8).

i. **Claim 12:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This includes a modeling path comprising an audio sensing module to distort the first audio signal in the same manner as distortion occurring responsive to sensing the second audio signal (Col 7 line 64 to Col 8 line 8).

j. **Claim 13:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to

model the channel response between the loudspeaker and microphone. This includes a modeling path comprising distortion modules to model distortions on the second audio signal via the chosen filter tap wieghts (Col 7 line 64 to Col 8 line 8).

k. **Claim 14:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses multiple distortion modules at various frequency bands to model the various channel responses (ie. the different types of distortions at each frequency band) between the loudspeaker and microphone (Col 7 line 64 to Col 8 line 8).

l. **Claim 15:** Chu's system operates in a standard communication system (Col 1 lines 15-25), as such all distortion modules must inherently alter the modeling path with real-time responsiveness for the purpose of allowing standard, real-time communication to occur between users of Chu's system.

m. **Claims 16-17:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This channel response would include a modeling path comprising distortion modules to model distortions of the first audio signal when sensed as an echo to the second audio signal (such as: microphone centerclipping and amplifier zero crossing distortion) via the chosen filter tap weights (Col 7 line 64 to Col 8 line 8).

n. **Claims: 18-21:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This

channel response would include a modeling path comprising distortion modules to model pre-established distortions of the first audio signal when sensed as an echo to the second audio signal and is operated in the frequency domain (various frequency bands) (Col 7 line 64 to Col 8 line 8). The audio generation module comprises echo cancellers 18 (Fig. 1) which are adaptive (Col 2 lines 9-34), and center-clippers 20 to model any nonlinear distortion (Col 7 lines 42-44).

o. **Claim 22:** Chu discloses a method of canceling an echo comprising the steps of:

i. Receiving a first audio signal shown as S(z) and being input to whitening filter 28, microphone gain sensor 60 and output signal conditioner 33 (Fig. 1).

ii. Receiving a second audio signal from microphone 10 (Fig. 1). Wherein a portion of the second audio signal includes an echo from the first audio signal (transmitted through speaker 32) (Col 1 lines 15-27).

iii. Having distortion module 15 (Fig. 1) receive the first audio signal and model all distortions on the first audio signal to create an estimation of the first signal echo sensed on the second audio signal (Col 3 lines 23-28).

iv. Using an adder module 54 (Fig. 3) to subtract the echo estimation of the first audio signal from the second audio signal in order to remove at least part of the first-audio-signal-echo from the second audio signal (Col 7 line 64 to Col 8 line 15).

p. **Claim 23:** Chu's modeling step comprises adaptively modeling one or more types of distortion (Col 8 lines 16-35).

q. **Claim 24:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a distortion module to model the channel response between the loudspeaker and microphone. This channel response would include a modeling path comprising distortion modules to model pre-established distortions of the first audio signal when sensed as an echo to the second audio signal and is operated in the frequency domain (various frequency bands) (Col 7 line 64 to Col 8 line 8).

r. **Claim 25:** Chu's system is implemented digitally (Col 3 lines 44-47). As such the first and second audio signals would inherently bear sequencing information that would be used by all parts of the system (including the adder module) for the purpose of synchronizing the input audio signals with the echo estimation signal to at least partially cancel the distorted echo of the first audio signal from the second audio signal.

s. **Claims 26-34:** Chu's method comprises the step whereby distortion module 15 (Fig. 1) receives the first audio signal S(z) through a signal splitter and uses a dsp as a set of distortion modules to model the channel response between the loudspeaker and microphone(Col 7 line 64 to Col 8 line 8). **(Claim 26)** This channel response would include a modeling path comprising distortion modules to model distortions of the first audio signal. The distortions would include those created by:

i. **Claim 27:** Playing the first audio signal through a speaker

ii. **Claim 28:** Amplifier clipping on the first audio signal

iii. **Claim 29:** Voice coil displacement on sound waves produced by the loudspeaker

iv. **Claim 30:** Harmonic distortion on sound waves produced by the loudspeaker

v. **Claim 31:** Hysteresis in iron inductors on the first audio signal

vi. **Claim 32:** Sensing the second audio signal

vii. **Claim 33:** Microphone center-clipping on the second audio signal

viii. **Claim 34:** Amplifier zero crossing distortion on the second audio signal

t. **Claim 35:** Chu discloses a terminal for an audio communications system comprising:

i. A first input for receiving a first audio signal shown as S(z) and being input to output-signal-conditioner 33 and loudspeaker 32(Fig. 1).

ii. A second input for receiving a second audio signal from microphone 10 (Fig. 1). Wherein a portion of the second audio signal includes an echo from the first audio signal (transmitted through speaker 32) (Col 1 lines 15-27).

iii. Distortion module 15 (Fig. 1) receives the first audio signal and models a distortion on the first audio signal to create an estimation of the first signal echo sensed on the second audio signal (Col 3 lines 23-28).

iv. An adder module 54 (Fig. 3) is used to subtract the echo estimation of the first audio signal from the second audio signal in order to remove at least part of the echo from the second audio signal (Col 7 line 64 to Col 8 line 15).

u. **Claim 36:** Chu's system is implemented digitally (Col 3 lines 44-47). As such the first and second audio signals would inherently bear sequencing information that

would be used by all parts of the system (including the adder module) for the purpose of synchronizing the input audio signals with the echo estimation signal.

v. **Claims 37-39,41-48,50-51:** Chu's system comprises distortion module 15 (Fig. 1) that receives the first audio signal S(z) through a signal splitter and uses a dsp as a set of distortion modules to model the channel response between the loudspeaker and microphone(Col 7 line 64 to Col 8 line 8). This channel response includes a modeling path comprising (**Claims 38-39,47-48**) distortion modules to model all the different types of distortion of the first and second audio signals. The distortions would include those created by:

i. **Claim 37:** Playing the first audio signal through a speaker

ii. **Claim 41:** Amplifier clipping on the first audio signal

iii. **Claim 42:** Voice coil displacement on sound waves produced by the loudspeaker

iv. **Claim 43:** Hysteresis in iron inductors on the first audio signal

v. **Claim 44:** Harmonic distortion on sound waves produced by the loudspeaker

vi. **Claim 45:** Linear changes in the second audio signal (done by echo cancellers 18 in Fig. 1)

vii. **Claim 46:** Sensing the second audio signal

viii. **Claim 50:** Microphone center-clipping on the second audio signal

ix. **Claim 51:** Amplifier zero crossing distortion on the second audio signal

w. **Claims 40,49:** Chu's system operates in a standard communication system (Col 1 lines 15-25), as such all distortion modules must inherently alter the modeling path with real-time responsiveness for the purpose of allowing standard, real-time communication to occur between users of Chu's system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 703-305-3433. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 703-305-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

DUC NGUYEN
PRIMARY EXAMINER

AJ
October 9, 2003